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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/540,475	03/31/2000	Nuri R. Dagdeviren	18	2477

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EXAMINER
MUNOZ, GUILLERMO

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/540,475	DAGDEVIREN, NURI R.	
	Examiner	Art Unit	
	Guillermo Munoz	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-24* is/are allowed.

6)☒ Claim(s) *1,3,4,15,16,25,27 and 39* is/are rejected.

7)☒ Claim(s) *2,5-14,17,26,28-38 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 15, 16, 25, 27, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Turner et al (US Patent Number 20020118702).

In regards to claims 1, 25 and 39; Turner et al teaches microprocessor circuitry and method of circuitry for precoding data signals for pcm transmission wherein:

- "The Tomlinson precoder includes an adder which sums the four bit 4B1H code generated by the code mapping translator with the output of a multitap filter. The multitap filter may include an finite impulse response (FIR) filter and an optional infinite impulse response (IIR) filter, and has its weighting coefficients established during a training mode of operation, in which an adaptive equalizer in the receiver section is configured and operated as a decision feedback device. The multitap filter is coupled to receive the output of a modulo index operator unit in the Tomlinson precoder. The modulo index operator, termed a modulo unit, is operative to adjust the output of the adder, as necessary, based upon integral multiples of the magnitude of the range of the

PAM coding space, such that the output of the unit falls within the coding range of the PAM signal (between the values: -16 and +16, for the above 4B1H line code example)" (page 2, paragraph 0016).

The multitap filter anticipates claimed feedback filter that generates a feedback signal as a function of the mapped constellation signal in claim 1, lines 3-4, claim 39, line 5, and claimed method in claim 25, line 3.

The adder which adjust the output based on the magnitude of the range of the PAM coding space anticipates claimed discrete modulo adder that generates the mapped constellation signal from the input signal and the feedback signal in claim 1, lines 5-6, claim 39, lines 6-8, and claimed method in claim 25, line 4.

The modulo index operator anticipates claimed discrete modulo adder utilizing an index to the constellation of levels chosen for the precoder, such that the amplitude of the mapped constellation signal is limited in claim 1, lines 6-8 and claimed method in claim 25, lines 5-6.

In regards to claims 3 and 27; Turner et al teaches a device and method for precoding data signals for pcm transmission wherein:

- "The multitap filter may include an finite impulse response (FIR) filter and an optional infinite impulse response (IIR) filter, and has its weighting coefficients established during a training mode of operation, in which an adaptive equalizer in the receiver section is configured and operated as a decision feedback device" (page 2, paragraph 0016).

The FIR filter anticipates a delay element and a weighting element such that the feedback filter multiplies a delayed version of the mapped constellation signal by the weighting element to generate the feedback signal in claims 3 and 27.

In regards to claims 15 and 16; Turner et al teaches a device and method for precoding data signals for pcm transmission wherein:

- "Because of the effect of the multitap filter, the value supplied to modulo unit will customarily be a non integer, whereby the output of the Tomlinson precoder has an effectively continuous signal characteristic. This effectively continuous, multi-bit, Tomlinson-precoded signal is applied through the combination of a digital-to-analog converter and low pass transmit shaping filter for transmission over the two-wire telephone channel by way of a line coupling circuit, such as a transformer interface unit" (page 2, paragraph 0017).

The digital-to-analog converter anticipates claimed digital to analog converter in claim 15. The transformer interface unit anticipates claimed transformer for operably coupling the digital to analog converter to an analog subscriber loop in claim 16.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al (US Patent Number 20020118702) in view of Cherubini et al (US Patent Number 6,061,407).

In regards to claim 4; as applied to claim 1 above, Turner et al teaches a device and method for precoding data signals for pcm transmission wherein:

- "During a training mode, the device is configured and operated as a decision feedback device for the purpose of established weighting coefficients to be applied to the filter structure of the Tomlinson precoder" (page 2, paragraph 0020).

Turner et al teaches using a training mode to establish the coefficients of the filter structure of the Tomlinson precoder. However, Turner et al is silent on the training mode being based on an impulse response.

Cherubini et al teaches another method of training a modem wherein:

- "the use of training sequence technology, and communicated back to the transmitter. As part of step 102, the channel coefficients a_l and b_l are obtained (e.g. from memory) such that $(1+ \Sigma_{l>=1} a_l D_l)/(1+\Sigma_{l>=1} b_l D_l)$ approximates the channel impulse response polynomial" (col.4, line 68-col.5,lines 1-4).

Therefore, it would have been obvious to one having ordinary skill in the art to train the Tomlinson precoder of Turner et al based upon the channel impulse response characteristics in view of Cole for the purpose of reducing the effects of intersymbol interference and noise.

Claim Objections

Claims 2, 5-14, 17, 26, 28-38, and 40 are objected to as being dependent upon a rejected base claims 1, , but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Allowable Subject Matter

Claims 18-24 are allowed.

The following is an examiner's statement of reasons for allowance:

The present invention comprises a precoder for an analog modem having a table identifying a basic constellation of levels and levels outside the basic constellation, wherein the levels outside the basic constellation are mapped onto levels inside the basic constellation as a function of an index associated with each level in the table. The closest prior art, Turner et al, (US Patent Number 20020118702) shows a similar circuit including a precoder. However, Turner et al fails to teach a pecoder having a table with a basic constellation of levels and levels outside the basic constellation. This distinct feature has been included in independent claim 18 rendering it allowable.

Drawings

The drawings filed on 03/31/00 are acceptable subject to correction of the informalities indicated on the attached "Notice of Draftsperson's Patent Drawing Review," PTO-948. In order to avoid abandonment of this application, correction is required in reply to the Office action. The correction will not be held in abeyance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9313 for regular communications and 703-872-9313 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Guillermo Munoz

GM
June 13, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600